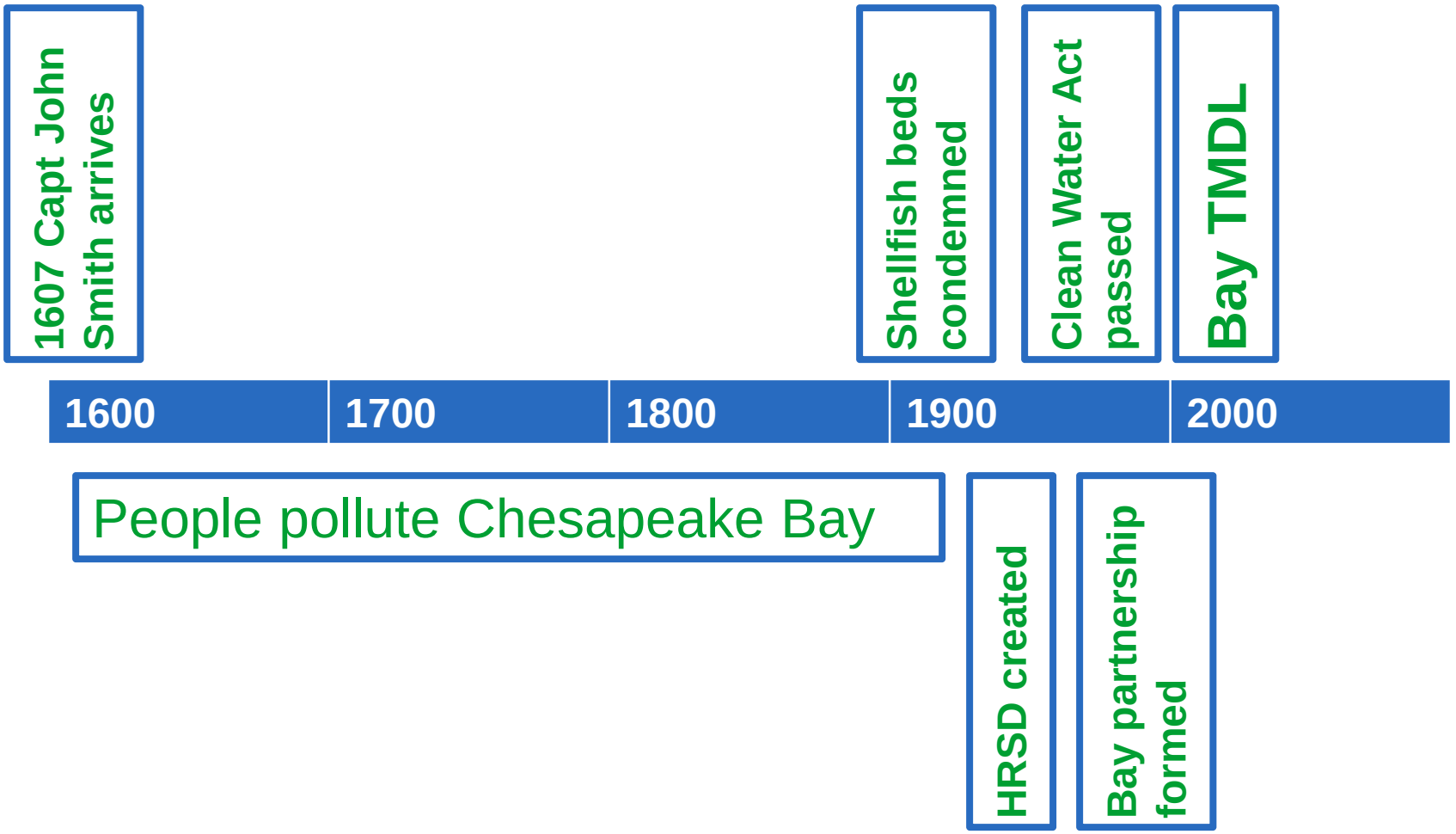
HRSD

Cleaning wastewater every day for a better Bay.

swift

Sustainable
Water Initiative
for Tomorrow

Our History


1607 Capt John Smith arrives
Shellfish beds condemned
Clean Water Act passed
Bay TMDL
1600
1700
1800
1900
2000
People pollute Chesapeake Bay
HRSD created
Bay partnership formed

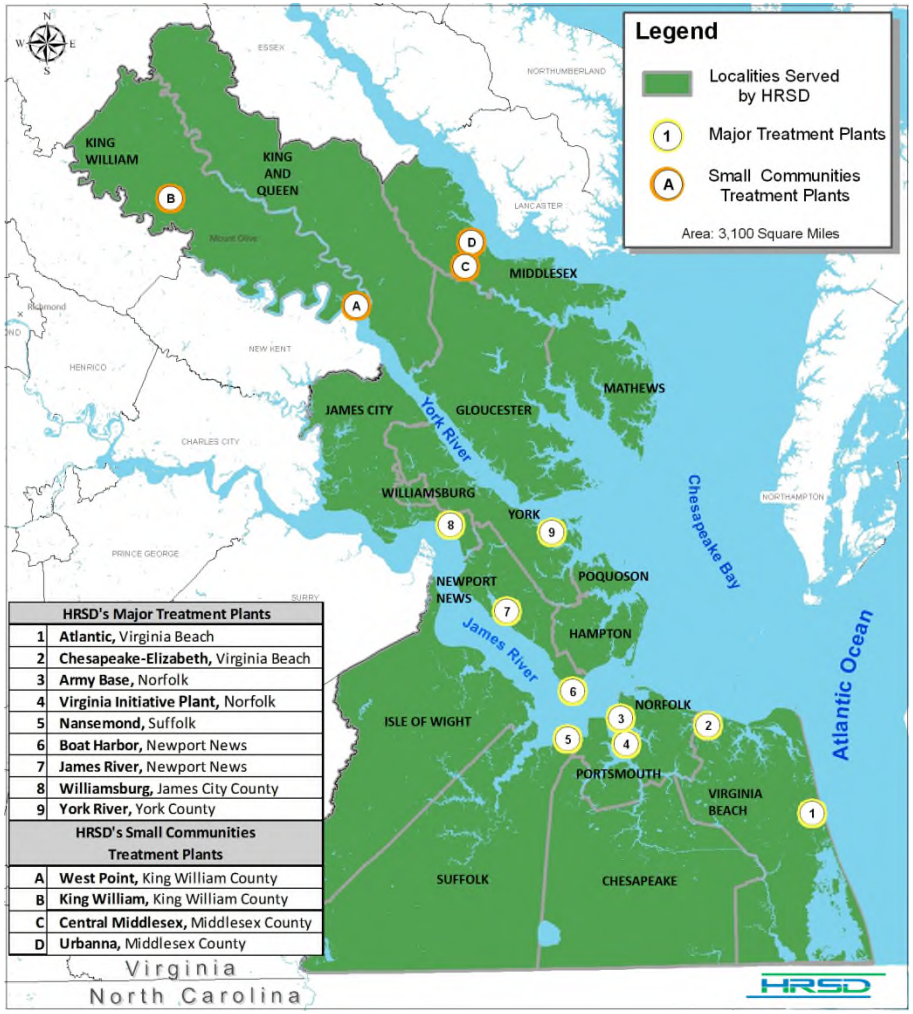
Who/What is HRSD?

- A political subdivision of the Commonwealth
- Truly a regional entity
- Governed by an 8 member Commission appointed by the Governor with residency requirements – Norfolk resident – Mike Glenn
- Independent rate setting authority with appeal rights through State Corporation Commission
- Very focused mission – ***We protect public health and the waters of Hampton Roads by treating wastewater effectively.***

HRSD by the Numbers

• Population served:	1.6 million
• Accounts	460,000
• Average daily flow (FY 15)	151 MGD
• Aggregate plant capacity	250 MGD
• FY 16 operating budget	$141 M
• FY 16 cash funded capital	$40 M
• FY 16 debt service/reserve	$60 M
• FY 16 Cap Ex	$155M
• 10 year CIP	$1.4 B
• 20 year CIP forecast	$4.2 B
• Rate per CCF	$4.53

HRSD Treatment Plants



HRSD's Major Treatment Plants	
1	**Atlantic,** Virginia Beach
2	**Chesapeake-Elizabeth,** Virginia Beach
3	**Army Base,** Norfolk
4	**Virginia Initiative Plant,** Norfolk
5	**Nansemond,** Suffolk
6	**Boat Harbor,** Newport News
7	**James River,** Newport News
8	**Williamsburg,** James City County
9	**York River,** York County

HRSD's Small Communities Treatment Plants	
A	**West Point,** King William County
B	**King William,** King William County
C	**Central Middlesex,** Middlesex County
D	**Urbanna,** Middlesex County

Atlantic (54 mgd)

Virginia Initiative Plant (40 mgd)

Nansemond (30 mgd)

Boat Harbor (25 mgd)

Army Base (18 mgd)

Chesapeake Elizabeth (24 mgd)

Williamsburg (22.5 mgd)

James River (20 mgd)

York River (15 mgd)

West Point (.6 mgd)

Central Middlesex (.025 mgd)

Urbanna (.1 mgd)

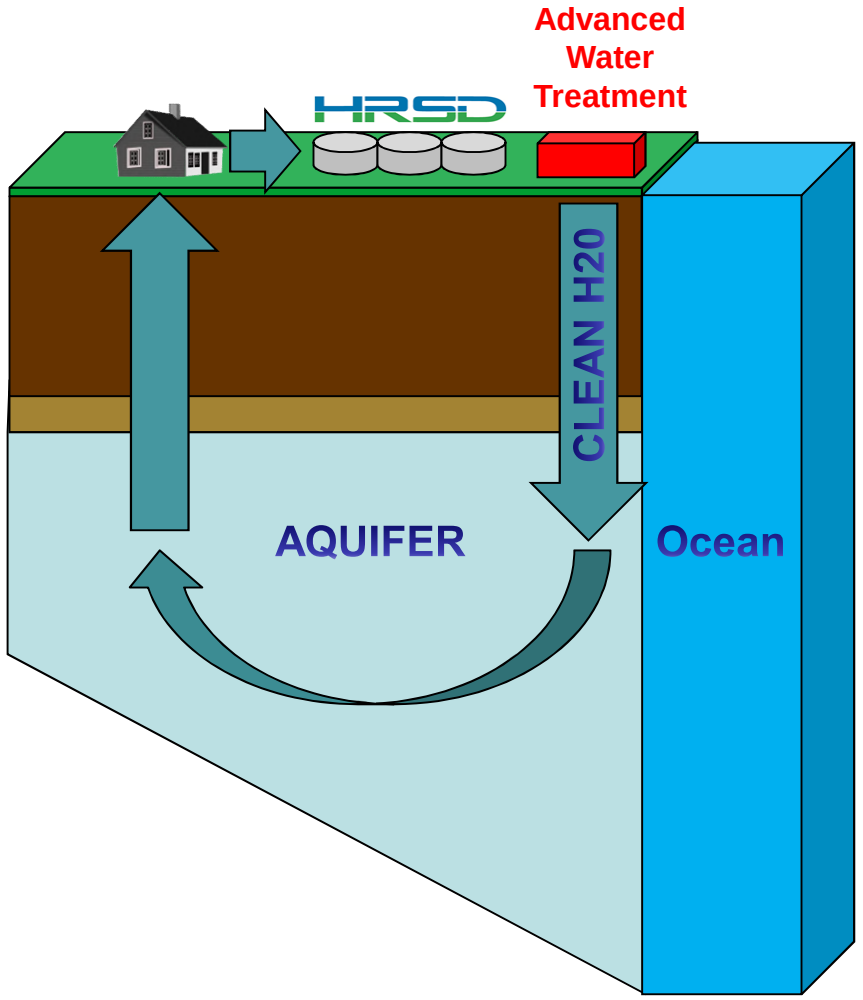
King William (.05 mgd)

Water issues challenging Virginia and Hampton Roads

- Restoration of the Chesapeake Bay
  - Harmful Algal Blooms
  - Localized bacteria impairments
  - Urban stormwater retrofits (cost and complexity)
- Adaptation to sea level rise
  - Recurrent flooding
- Depletion of groundwater resources
  - Including protection from saltwater contamination
- Wet weather sewer overflows
  - Compliance with Federal enforcement action

SWIFT – Sustainable Water Initiative for Tomorrow

- Treat water to meet drinking water standards and replenish the aquifer with clean water to:
  - Provide regulatory stability for wastewater treatment
  - Reduce nutrient discharges to the Bay
  - Reduce the rate of land subsidence
  - Provide a sustainable supply of groundwater
  - Protect the groundwater from saltwater contamination



Advanced water treatment – to drinking water standards

- Advanced treatment used throughout world, many locations in USA and even in Virginia to produce water that exceeds drinking water standards
  - Upper Occoquan Service Authority/Fairfax Water
  - Loudoun Water
  - Montebello Forebay, CA 1962
  - El Paso, TX 1985
  - Scottsdale, AZ 1999
  - Orange County, CA 2008
  - Arapahoe, CO 2009
  - ***San Diego, CA 2020***

Membrane based

Carbon based

Groundwater replenishment

- Aquifer replenishment also done in many places including Virginia
  - City of Chesapeake Aquifer Storage and Recovery system – over 2.8 billion gallons pumped to date

Water must meet human health criteria and match existing groundwater geochemistry.

Water Issues Challenging Virginia and Hampton Roads

- **Restoration of the Chesapeake Bay**
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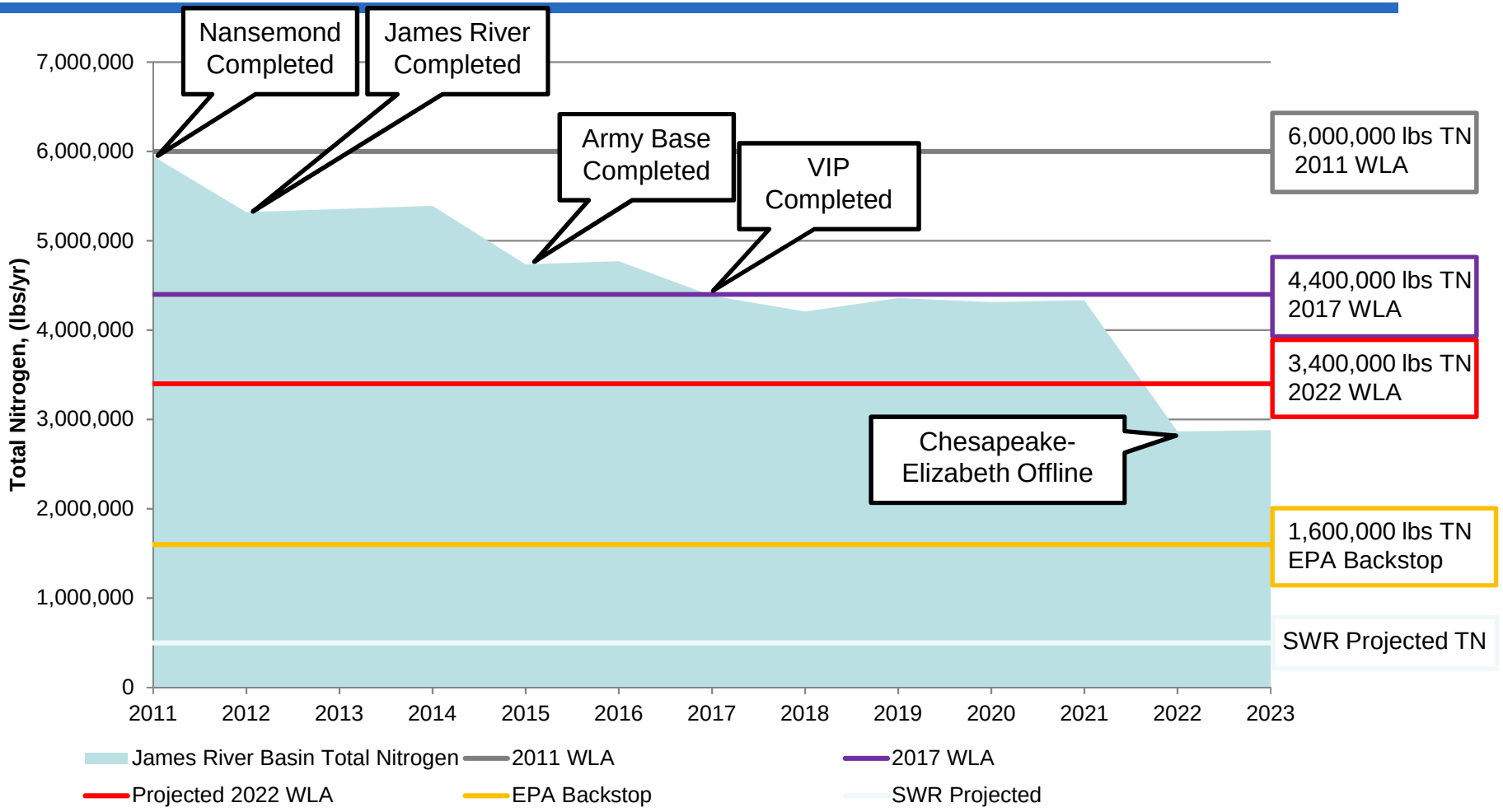
Impact on nutrient reductions



James River Basin – TN Similar results with TP and TSS and in other river basins.

WLA – Nutrient Waste Load Allocation in lbs/yr

Potential to offset stormwater reductions

	HRSD Bay TMDL Allocations	HRSD Post SWRI Loads (2030)	Available for other needs	Stormwater Reduction Needs*
Nitrogen				
James	3,400,000	500,000	2,900,000	63,039
York	275,927	25,000	250,927	19,114
Phosphorus				
James	300,009	50,000	250,009	13,088
York	18,395	2,000	16,395	3,887
Sediment				
James	14,000,000	700,000	13,300,000	5,269,142
York	1,400,000	98,000	1,302,000	1,413,762

* DEQ Regulated Stormwater w/o federal lands

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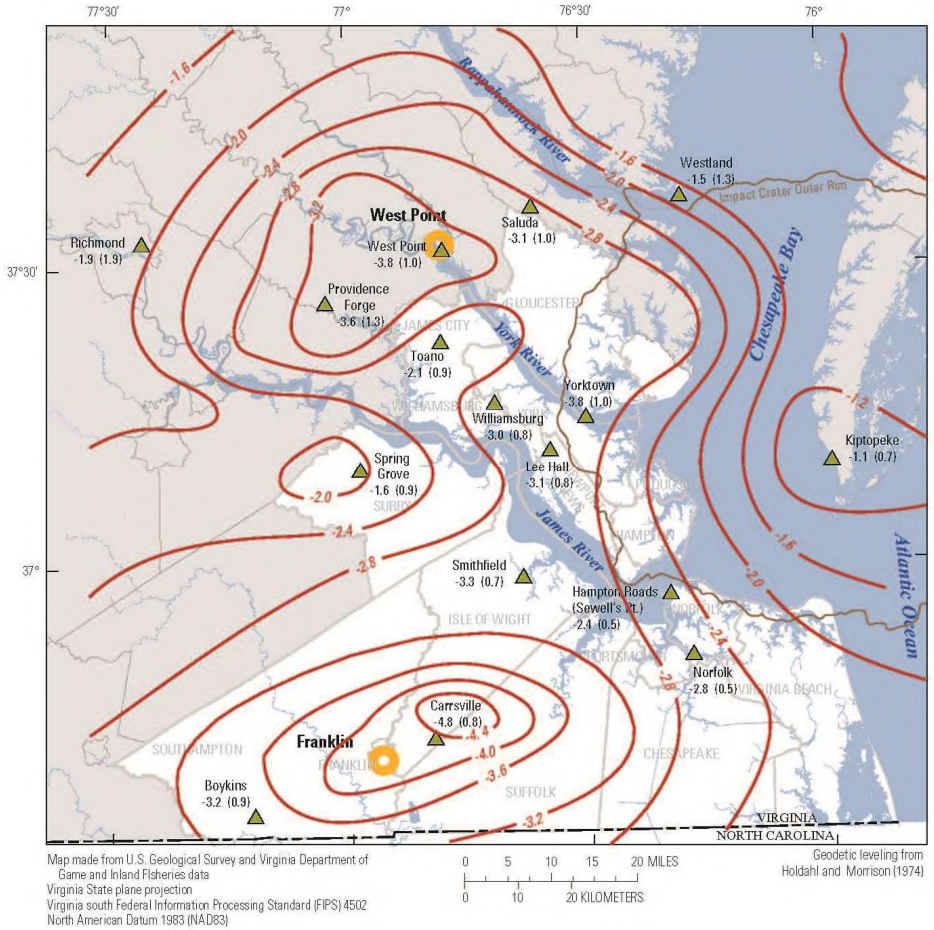
Land subsidence – *we are sinking*

- According to USGS
  - Up to 50% of sea-level rise may be due to land subsidence
  - **Up to 50% of land subsidence may be due to aquifer compaction**

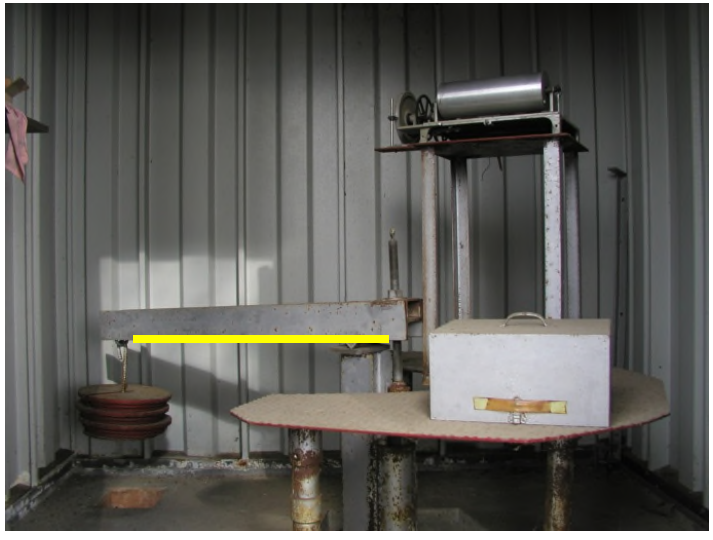


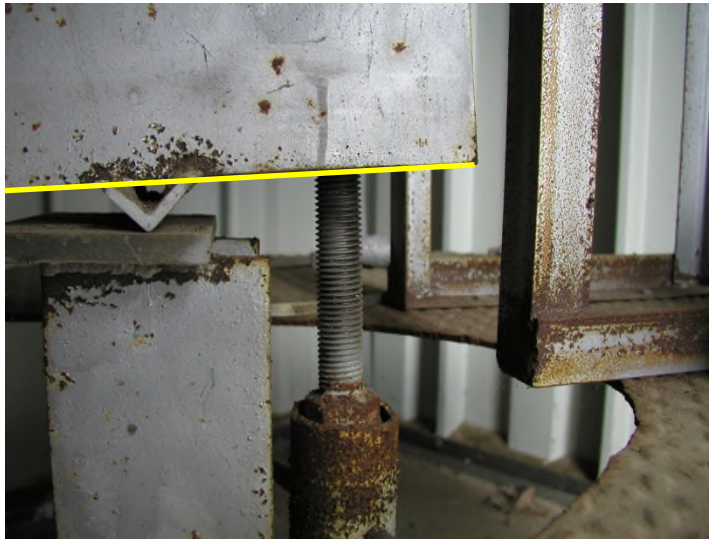
HAMPTON ROADS IS THE #2 LARGEST POPULATION CENTER AT RISK

HRSD

Evidence of groundwater impacts on subsidence

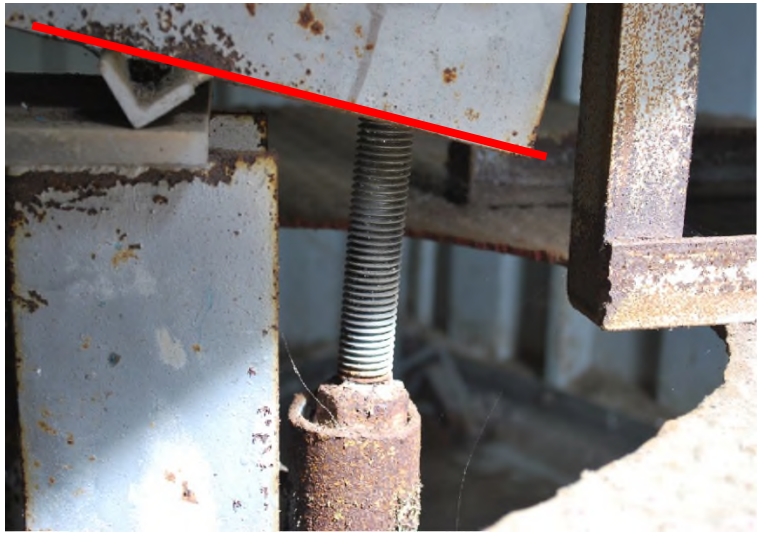
2002





USGS found ground level rose 32 mm between 2002 and 2015 coinciding with reduced groundwater withdrawal by Franklin paper mill.

2015



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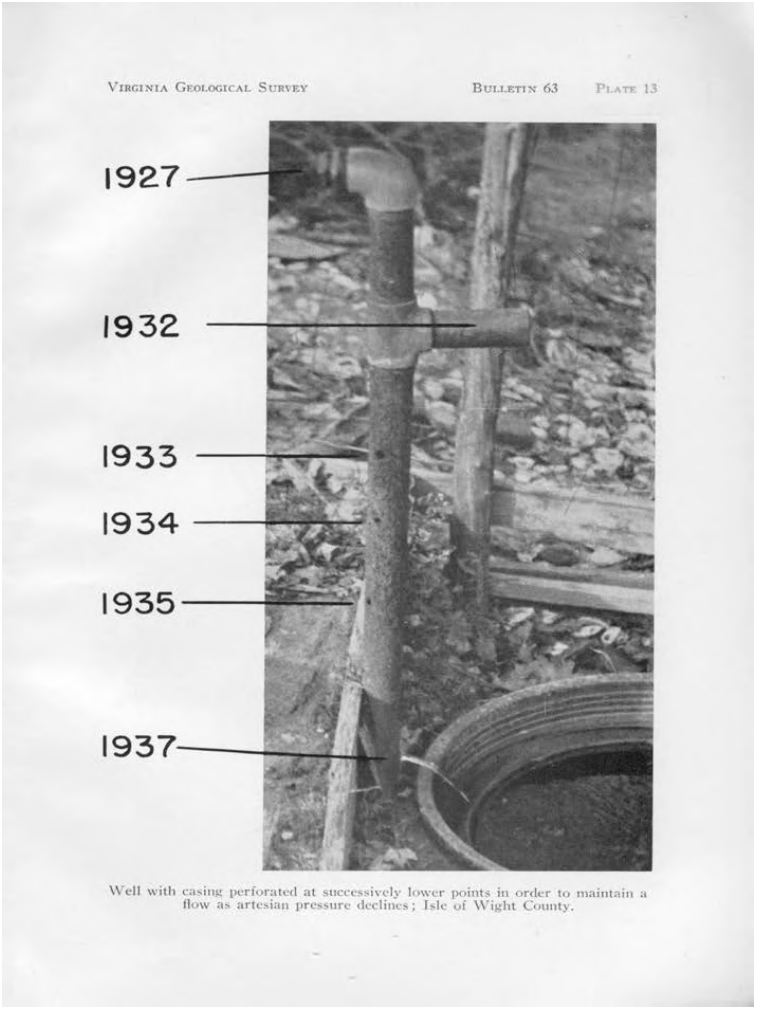
Groundwater depletion has been rapid

A, Overflow from artesian well in Isle of Wight County is wasted.

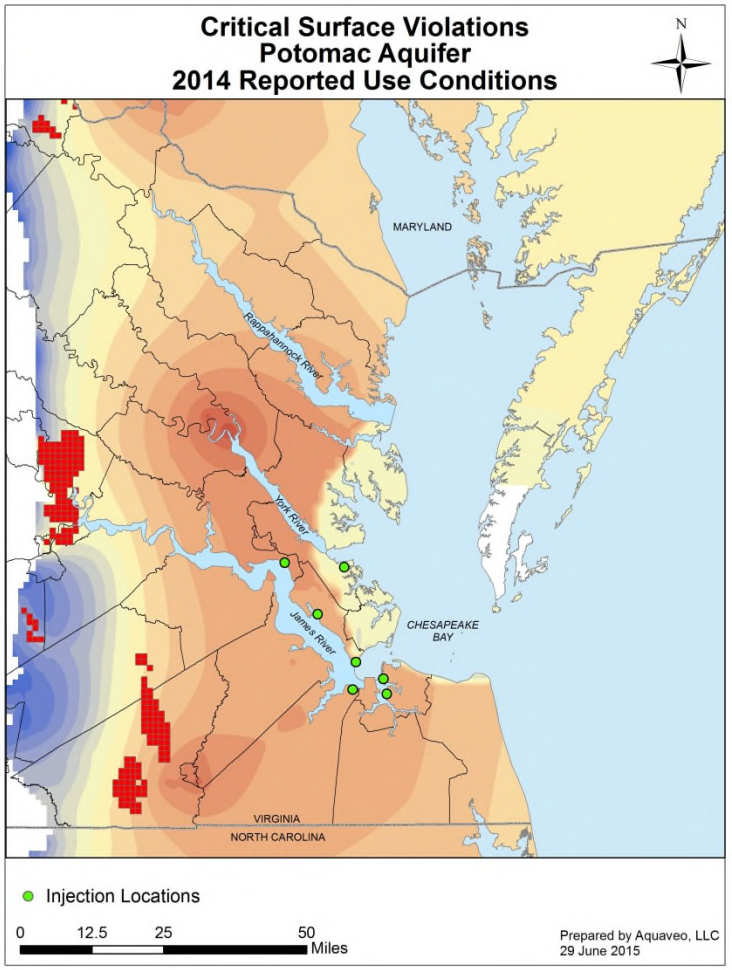


Well with casing perforated at successively lower points in order to maintain a flow as artesian pressure declines; Isle of Wight County.

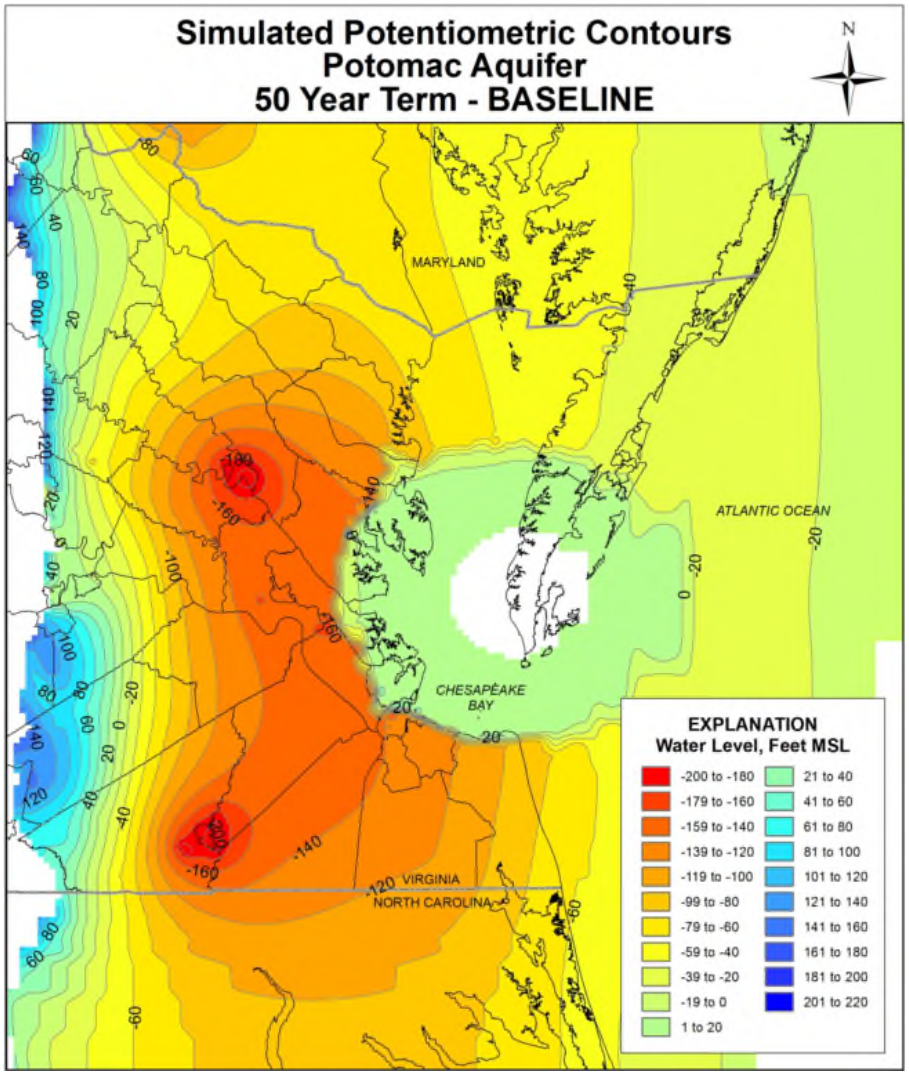
- Artesian wells in early 1900s – groundwater wells required valves not pumps!
- In about 100 years have gone from water levels at 31 feet above sea level to 200± feet below.

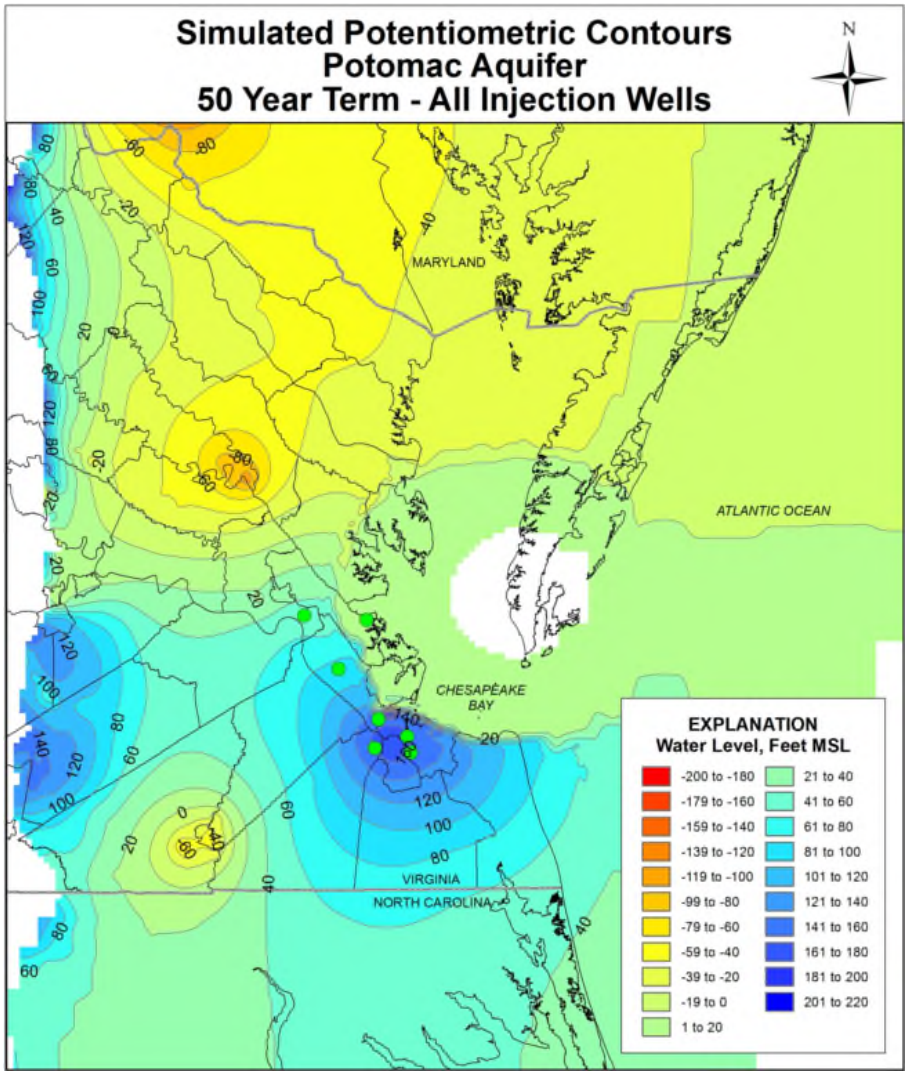
Unsustainable Aquifer Withdrawals

- Over-allocated permitted withdrawal
  - Water levels falling several feet/yr
- 177 permits = 147.3 MGD
  - Currently withdrawing approximately 115 mgd
- 200,000 unpermitted “domestic” wells
  - Estimated to be withdrawing approx. 40 mgd growing at 1 mgd per year



Potomac Aquifer water levels before and after SWRI





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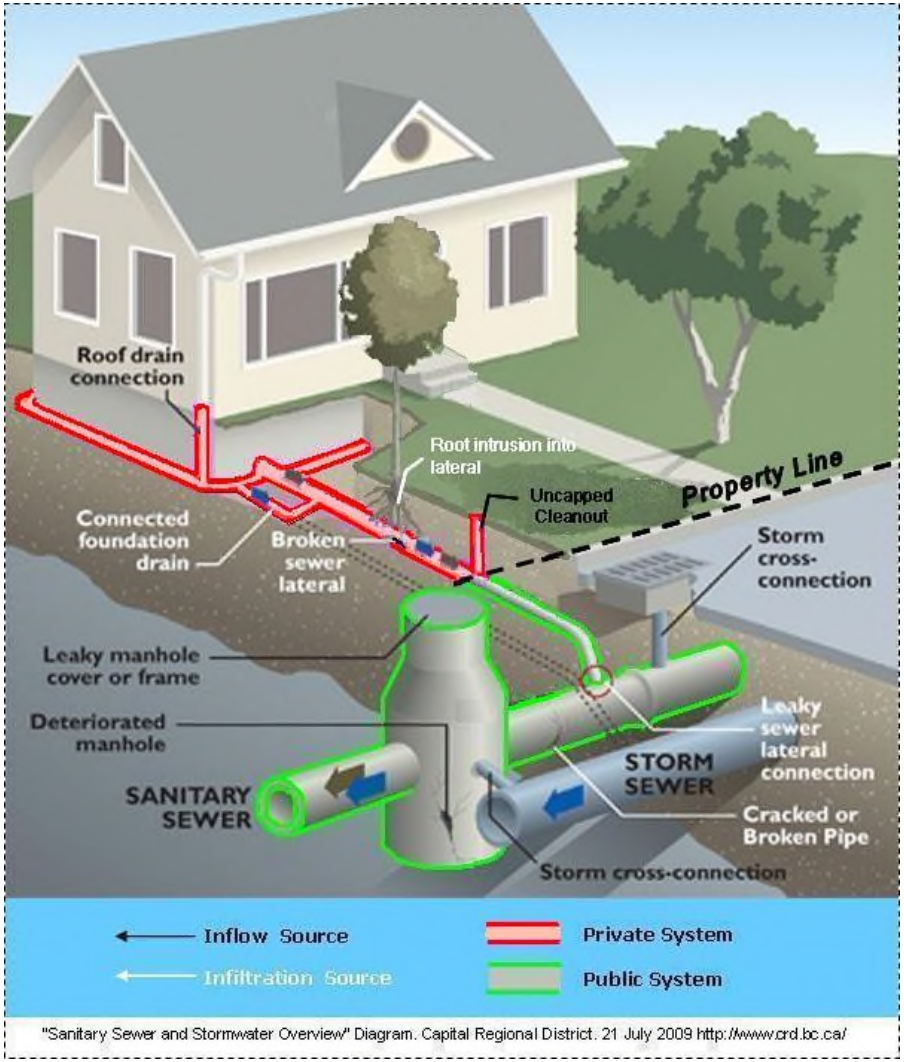
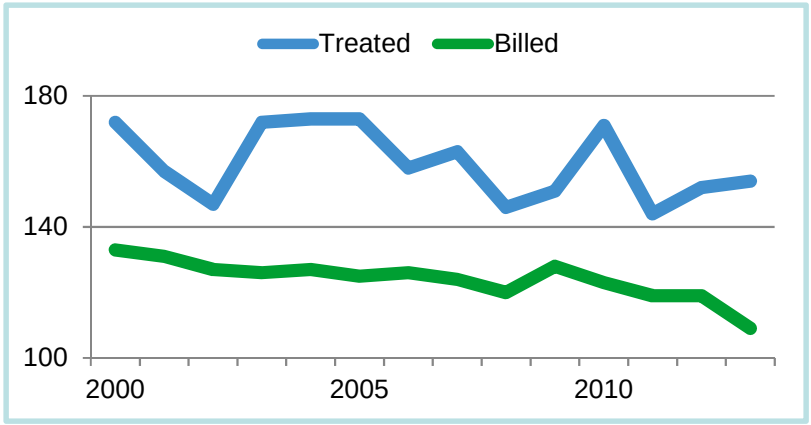
Sewer Overflows





- Consent Decree
- **HRSD responsible for regional wet weather flows**
- Region loses less than 0.015% in a bad year

Sewer Overflows

- No chronic locations
- No data to support episodic SSOs contribute to local water bacteria impairment
- Recent success with more focused efforts
  - Wet weather and dry weather monitoring
  - Source tracking “hot spots”
  - Coordinating field work with locality
- Overflows not eliminated with Regional Wet Weather Plan when weather event generates flows above designed service level

Conclusion – SWRI Summary of Benefits

- Regulatory stability for treatment processes
- Significantly reduced discharge into the Chesapeake Bay (only during wet weather)
  - 90% reduction of HRSD discharges into James, York and Elizabeth Rivers
  - Creates source of nutrient allocation to support other needs **(STORMWATER)**
- Potential reduction in the rate of land subsidence
- Sustainable source for groundwater replenishment
- Protection of groundwater from saltwater contamination

Cost Summary

- Total project in the $1 billion range (120 mgd)
  - For 7 plants (not Ches-Liz or Atlantic)
- Annual operating costs $21 - $43 M
- Can only be achieved if EPA allows enough flexibility to integrate into wet weather work
  - Cannot afford to add SWRI into existing plan without significant rate increases and potential downgrade
  - Approximately 50% of HRSD $4.4B CIP will be dedicated to wet weather
    - Not most important water quality issue
    - Plan would be to accomplish critical wet weather issues and SWRI in early years and delay remaining wet weather work

Why now?

- Consent Decree requires plan submittal with schedule to EPA October 2017
  - Lose financial ability to pursue water recycling project until 2037 at earliest
- Bay TMDL deadline is 2025
  - Will require more significant investments in nutrient and sediment removal without water recycling project
  - HRSD is backstop if Agriculture and Stormwater come up short
- Groundwater scarcity will continue to get worse
  - Will force development of additional water supplies by local governments
  - Chills development in eastern Virginia
  - Potential loss of water dependent industries
- Next regulation (viruses, emerging contaminants, ???) will require plant upgrades

Timeline

- Complete next phase of study with consultant by end of 2016
- Room scale pilot projects – operating since June 2016
- 2018
  - Demonstration pilot (2 year study)
- 2020
  - EPA/DEQ/VDH formally approves Certificate to Construct for SWR
- 2020 to 2030
  - Construction through phased implementation
- 2030 Fully operational
  - 120 MGD of clean water put into the aquifer

HRSD

In the news

The Virginian-Pilot

Our 152nd year | SUNDAY | 01.31.16 | PILOTONLINE.COM | $2.50 in Hampton Roads

UPTO $148 IN COUPONS TODAY

Tod Hamlin, general manager of the Hampton Roads Sanitation District, was tired of watching treated water flow untouched into rivers and the bay. Then the idea hit him.

Can your sinks and toilets fight sea-level rise?

recycling water

A Hampton Roads Sanitation District plan to pump treated wastewater more than a thousand feet below it to the region's aquifers could slow the sinking of land – known as subsidence – and help meet a federal mandate to clean up the Chesapeake Bay.

obstacles

Besides convincing residents that water going into the ground is clean enough to drink, there's the cost. Including design and construction, it is projected to be $1 billion over 15 years.

SINKING LAND is part of the problem, as society guzzles groundwater. One solution is to pump treated wastewater back in.

By Dave Mayfield
The Virginian-Pilot

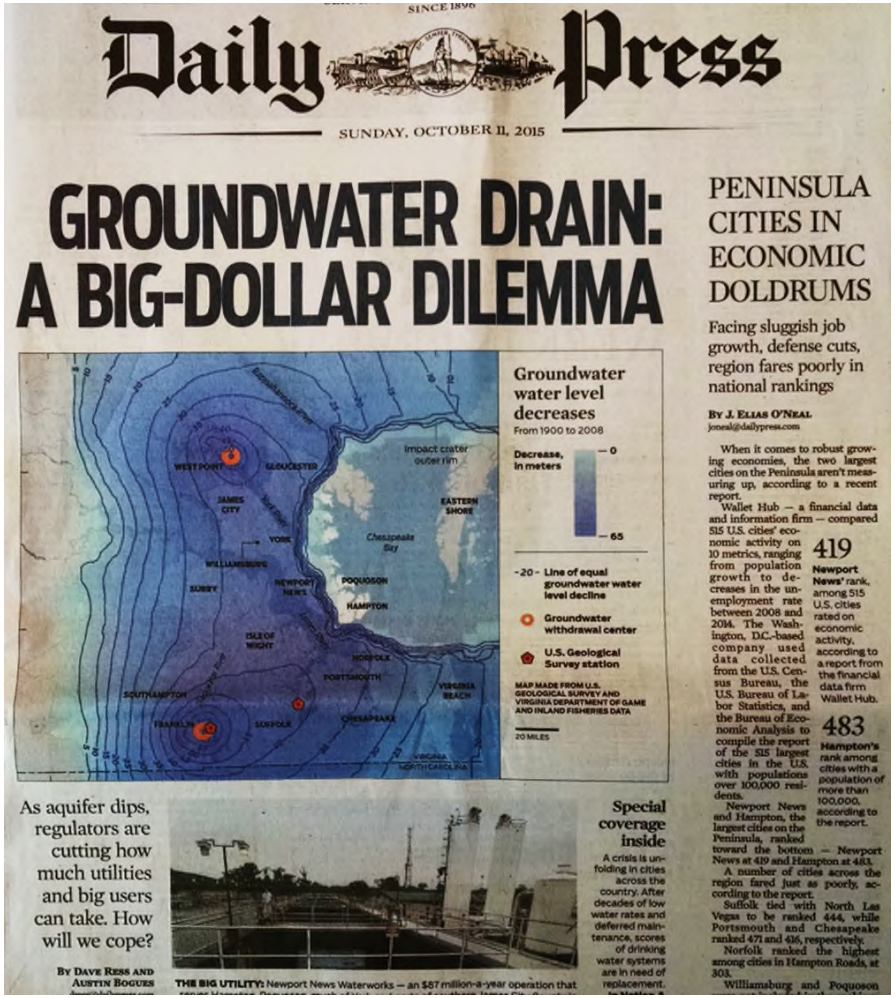
[illegible] A clear Decem- saying, 'Can we figure out how to do this?'" said Henifin, HRSD's general manager.

Virginia GOP asks state to cancel "loyalty oath"

Republican party cites "bad publicity" as cause for reversal

By Bill Bartel
The Virginian-Pilot

State Republican Party leaders voted in Richmond on Saturday to ask the state to cancel a required party loyalty pledge in the March 1 GOP presidential primary.



Daily Press

SINCE 1896

SUNDAY, OCTOBER 11, 2015

GROUNDWATER DRAIN: A BIG-DOLLAR DILEMMA

As aquifer dips, regulators are cutting how much utilities and big users can take. How will we cope?

By Dave Ress and Austin Bogues

THE BIG UTILITY: Newport News Waterworks — an $87 million-a-year operation that

Special coverage inside

A crisis is unfolding in cities across the country. After decades of low water rates and deferred maintenance, scores of drinking water systems are in need of replacement.

PENINSULA CITIES IN ECONOMIC DOLDRUMS

Facing sluggish job growth, defense cuts, region fares poorly in national rankings

By J. Elias O'Neal
joneal@dailypress.com

When it comes to robust growing economies, the two largest cities on the Peninsula aren't measuring up, according to a recent report.

Wallet Hub — a financial data and information firm — compared 515 U.S. cities' economic activity on 10 metrics, ranging from population growth to decreases in the unemployment rate between 2008 and 2014. The Washington, D.C.-based company used data collected from the U.S. Census Bureau, the U.S. Bureau of Labor Statistics, and the Bureau of Economic Analysis to compile the report of the 515 largest cities in the U.S. with populations over 100,000 residents.

Newport News and Hampton, the largest cities on the Peninsula, ranked toward the bottom — Newport News at 419 and Hampton at 483.

A number of cities across the region fared just as poorly, according to the report.

Suffolk tied with North Las Vegas to be ranked 444, while Portsmouth and Chesapeake ranked 471 and 416, respectively.

Norfolk ranked the highest among cities in Hampton Roads, at 303.

Williamsburg and Poquoson

419
Newport News' rank, among 515 U.S. cities rated on economic activity, according to a report from the financial data firm Wallet Hub.

483
Hampton's rank among cities with a population of more than 100,000, according to the report.

Questions?

Future generations will inherit clean waterways and ***be able to keep them clean****.*

thenifin@hrsd.com
http://www.hrsd.com/SWR.shtml

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